

CURRICULUM VITAE

Mark B. Williams

I. Personal Data

UVa Health Sciences Center
Department of Radiology
Box 801339
Charlottesville, VA 22908
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434-924-9435 (fax)
mbwilliams@virginia.edu

II. Education

Year	Degree	Institution
[----]	BA, Physics	Grinnell College, Grinnell, IA

III. Post-Graduate Education

Year	Degree	Institution
[---]	PhD, Physics	University of Virginia, Charlottesville, VA
[---]	MS, Physics	Wake Forest University, Winston Salem, NC

IV. Academic Appointments

Mo/Yr	Position	Institution
07/00	Associate Professor of Radiology and Biomedical Engineering	University of Virginia
04/96	Assistant Professor of Radiology and Biomedical Engineering	University of Virginia
02/96	Assistant Research Professor, Nuclear Institute, Department of Physics	University of Virginia
04/94-03/96	Assistant Research Professor of Radiology	University of Virginia
07/93-03/94	Senior Scientist, Department of Physics	University of Virginia
07/92-06/93	Research Scientist, Department of Physics	University of Virginia
09/90-06/92	Research Associate, Department of Physics	University of Virginia

V. Other Employment Pertaining to Current Professional Appointment

Scientific Consultant Positions

2002-present Creatv MicroTech, Inc., Potomac, MD
2001-present Mikro Systems, Inc., Charlottesville, VA
2001-present Instrumentarium Imaging, Tuusula, Finland
2001 Lorad/Hologic, Danbury, CT
1998-present Swissray America, Inc., Gig Harbor, WA
1998 Quantum Imaging Corp., Bountiful, UT
1997-1998 Trex Medical Corp., San Diego, CA
1997 Eastman Kodak Company, Rochester, NY
1995-1997 Science Applications International Corp., San Diego, CA
1992-1995 Los Alamos National Laboratories, Space Astronomy and Astrophysics
Division, Los Alamos, NM
1992-1994 Phillips Scientific Co., Ramsey, NJ

Other Teaching Positions

[-----] Graduate Teaching Assistant, University of Virginia, Department of
Physics
[-----] Graduate Teaching Assistant, Wake Forest University, Department of
Physics
[-----] High School Physics and Math Teacher, US Peace Corps, Fiji

VI. Certification

[-----] Virginia Department of Health, inspector of mammographic and diagnostic
radiologic equipment.

VII. Professional Affiliations

Year	Organization
2002-present	Academy of Molecular Imaging (AMI)
1998-present	Society of Noninvasive Imaging (SNIDD)
1997-present	Institute of Electrical and Electronics Engineers (IEEE)
1997-1999	Society for Health Services Research in Radiology
1996-present	American Association of Physicists in Medicine (AAPM)
1995-present	Virginia Chapter of Health Physics Society
1993-present	SPIE International Technical Working Group on Penetrating Radiation
1992-present	Society of Photo-Optical Instrumentation Engineers (SPIE)
1990-present	American Physical Society (APS)

VIII. Committee Appointments

A. International

- 2001-present Scientific Program Committee, American Association of Physicists in Medicine annual meeting.
- 2000-present IEEE Nuclear Medicine and Imaging Sciences Technical Committee (NMISTC) member.
- 2000-2001 International Advisory Committee, Symposium for Functional Breast Imaging with Advanced Detectors, April 18 – 21, 2001, Rome, Italy.
- 2000-2001 Organizing Committee, 4th International Meeting on High Resolution Imaging in Small Animals: Instrumentation, Applications and Animal Handling, September 2 – 4, 2001, Washington DC.
- 1999-2000 Scientific Committee, 5th International Workshop on Digital Mammography, June 11-14, 2000, Toronto, Canada.
- 1999 Scientific Committee, Annual Meeting, American Association of Physicists in Medicine, July 25 – 29, 1999, Nashville, TN.
- 1998, 1999 Program Committee, IEEE Nuclear Science Symposium/Medical Imaging Conference.
- 1993-1999 Scientific Program Committee, SPIE International Symposium, Conference on X-ray and Gamma Ray Detector Physics and Applications.

B. National

- 1999-present IEEE Nuclear Medicine and Imaging Sciences Technical Committee (NMISTC) member.
- 1999-2005 Publications Committee, American Association of Physicists in Medicine.
- 1997-present Member, International Digital Mammography Development Group.
- 1997-2000 Committee member, American Association of Physicists in Medicine Science Council: Task Group #4, Instrumentation Requirements of Diagnostic Radiological Physicists.
- 1996-1999 Scientific Committee, Association of University Radiologists.
- 1994-1999 Organizing Committee, InfoRAD Exhibits on Digital Mammography and Digital Chest Radiography, Radiological Society of North America.

C. Institutional

- 2004-present Faculty Director, Small Animal Multi-Modality Imaging Core (SAMMIC)
- 2003-2004 Search Committee for Department of Radiology Chair
- 2002, 2005 Promotion and Tenure Committee, Department of Radiology
- 2002-present Search Committee, Director of Radiological Physics
- 2001-present Search Committee, Breast Imaging Division, Department of Radiology
- 1999-2004 Space Allocation Committee, Research Division, Department of Radiology

IX. Referee: Journals, Scientific Meetings, and Funding Agencies

A. Editorial Boards, Peer Reviewed Journals

2003-present Editorial Board, Journal of the American College of Radiology
2002-present Associate Editor, Technology in Cancer Research & Treatment
2002-present Associate Editor, Medical Physics

B. Reviewer, Peer Reviewed Journals

2003-present Journal of the American College of Radiology
2002-present Medical Imaging Conference Issue, IEEE Transactions on Nuclear Science
2002 Nuclear Instruments and Methods in Physics Research A
2000-present Journal of Nuclear Medicine
1999-present Physics in Medicine and Biology
1999-2001 International Journal of Radiation Oncology, Biology, and Physics
1998-present Medical Physics
1997 Lancet
1996-1999 IEEE Transactions on Medical Imaging
1995-2002 Academic Radiology
1993 IEEE Transactions on Nuclear Science

C. Abstract Reviewer, Scientific Meetings

2001-present American Association of Physicists in Medicine annual meeting.
2001 HiRes 2001: High Resolution Imaging in Small Animals with PET, MR and
Other Modalities: Instrumentation, Applications and Animal Handling,
September 9-12, 2001, Rockville, MD.
2000 5th International Workshop on Digital Mammography, June 11-14, 2000,
Toronto, Canada.
1998-present IEEE Nuclear Science Symposium and Medical Imaging Conference.
1996-1999 Association of University Radiologists.
1993-1995 Society of Photo-optical Instrumentation Engineers.

D. Grant Reviewer, Funding Agencies

2006 Science Center, U.S. Department of State (external reviewer)
2006 Netherlands Organization for Scientific Research, and the Dutch Ministry of
Economic Affairs
2003-2006 National Cancer Institute of Canada (Study Section member)
2002, 1996, NSF Advisory Panel for SBIR grant applications for biological
1994 instrumentation (Study Section member)
2002 California Breast Cancer Research Program study section (external
reviewer)
2002, 2000 NIH Shared Instrumentation Grants (Study Section member)
2001 US Army Breast Cancer Research Program (Study Section member)
2000-2003 Susan G. Komen Breast Cancer Foundation (Study Section member)
1997, 2002 NSF SBIR/STTR Program (Study Section member)

- 2000 DOE SBIR/STTR Program (Study Section member)
- 2000 United States Civilian Research and Development Foundation (external reviewer)
- 1999 Jeffress Memorial Trust (external reviewer)
- 1998 Radiological Society of North America (external reviewer)
- 1994 DOE STTR Program (external reviewer)

X. Advisory Committees and Task Groups

- 2005-present Member, FDA National Mammography Quality Assurance Advisory Committee (NMQAAC)
- 2004-present Committee member, Joint ACR/RSNA/AAPM/SCAR Committee for the Establishment of Guidelines for Image Quality in Digital Mammography
- 2000-present American College of Radiology (ACR) Subcommittee on Standards for Digital Mammography.
- 1997-2000 Scientific Advisory Panel, PHS Office of Women’s Health and the NCI, X-Ray Detectors and Displays for Digital Mammography, Technology Transfer Workshop on Breast Cancer Detection, Diagnosis, and Treatment, Federal Multi-Agency Consortium on Imaging Technologies to Improve Women’s Health.
- 1995-1999 Task Group on Instrumentation Requirements for Diagnostic Radiological Physicists, American Association of Physicists in Medicine.
- 1998 Scientific Panel Member, PHS/NCI Working Group on Digital Mammography.

XI. Personnel Supervised

Graduate Students:

- | | | |
|--------------|---------|-----------------------------|
| 2004-present | [-----] | PhD, Biomedical Engineering |
| 2004-present | [-----] | PhD, Physics |
| 2002-present | [-----] | PhD, Engineering Physics |
| 2001-present | [-----] | PhD, Physics |
| 1999-2004 | [-----] | PhD, Biomedical Engineering |
| 2003-2004 | [-----] | PhD, Engineering Physics |
| 2002 | [-----] | PhD, Physics |
| 2000-2002 | [-----] | MS, Biomedical Engineering |
| 2000-2002 | [-----] | MS, Biomedical Engineering |
| 2000-2001 | [-----] | PhD, Biomedical Engineering |
| 1999-2001 | [-----] | PhD, Engineering Physics |
| 1998-1999 | [-----] | MS, Biomedical Engineering |
| 1998-1999 | [-----] | PhD, Engineering Physics |
| 1997-2000 | [-----] | PhD, Nuclear Engineering |
| 1996-1998 | [-----] | ME, Engineering Physics |
| 1996-1998 | [-----] | MS, Biomedical Engineering |

Medical Student Research Advisor:

2004 [-----]

Undergraduate Research Advisor:

2005 [-----] 4th year physics (senior research project)
 2005 [-----] 4th year SEAS (senior research project, [----
 ---], co-advisor)
 2005 [-----] 4th year SEAS (senior research project)
 2005 [-----] 4th year SEAS (senior research project)
 2003 [-----] 3rd year SEAS
 2003 [-----] 3rd year, BME internship
 2002, 2003 [-----] 3rd and 4th year, BME internship (2 summers),
 SEAS senior research project
 2001 [-----] School of Arts and Sciences (Physics)
 2000 [-----] 4th year SEAS (senior research project)

Other:

2000-present Small Animal Multimodality Imaging Center (SAMMIC) research
 technician: [-----]
 2000-present Radiology Department Research Division Secretary: [-----]
 1998-2000 Instructor, Department of Radiology: [-----]
 1998-2002 Radiology Department Research Technologist: [-----
 -----]

XII. Teaching Activities (since 1995)

A. National

2005 Faculty member, Digital Mammography Quality Control Workshop,
 Medical Technology Management Institute, Bethesda, MD, April 15, 16
 2005.
 2002 Faculty member, Era of Hope DOD BCRP Meeting, September 25-28,
 2002.
 2001 Invited lecture, “Technical Considerations in Full Field Digital
 Mammography”, American College of Radiology, ACR Headquarters,
 Reston, VA, August 15, 2001.
 2001 Invited CME lecture, “Update on Full Field Digital Mammography”,
 American Association of Physicists in Medicine Annual meeting, Salt Lake
 City, UT, July 22-26, 2001.
 2000 Invited lecture, Johns Hopkins University, “Mammography Physics and
 Quality Assurance Issues”, December 11, 2001.
 1997 Instructor, Enterprise Information Systems Workshop, InfoRad, RSNA
 meeting, Chicago, IL, November 29 – December 2, 1997.

- 1997 Refresher Course, Stereotactic Breast Biopsy: Theory, Accreditation and Calibration, AAPM Annual Meeting, Milwaukee, WI, July 27-31, 1997.
- 1997 Faculty member, Computed Radiography: An Educational Forum, Clearwater, FL, February 1-4, 1997.

B. Regional

- 2005 Faculty member, Medical Technology Management Institute, Hands On Workshop for Surveying Digital Mammography Units, Bethesda, MD, April 15, 16, 2005.
- 2003 Co-director and faculty member, Symposium on Emerging Issues in Mammography. Jointly sponsored by JHU and the Mid-Atlantic Chapter of the American Association of Physicists in Medicine. Johns Hopkins University, September 5 - 6, 2003.
- 1999 Director and faculty member, Second Symposium on Emerging Issues in Mammography, Charlottesville, VA, September 24 - 25, 1999.
- 1996 Director and faculty member, Symposium on Emerging Issues in Mammography, jointly sponsored by UVa Health Sciences Center and Mid-Atlantic Chapter of the American Association of Physicists in Medicine, Charlottesville, VA, September 20 - 21, 1996.
- 1995-1998 Faculty member, Practical Radiology Graduate Course, Charlottesville, VA.
- 1995 Faculty member, Fluoroscopy : Exposure, Injuries, and Interventional Procedures, Division of Radiological Physics of the UVa Health Sciences Center and The Mid-Atlantic Chapter of the American Association of Physicists in Medicine, Charlottesville, VA, September 22,23, 1995.

C. University

- 2005, 2006 PHYS 593: Graduate level independent study, instructor.
- 2005 PHYS 393: Independent study, instructor.
- 2003 EP 793: Independent study in Medical Physics, instructor.
- 2003 Medical School: Practical Molecular Medicine (graduate), spring 2003, one instructor of 6 total.
- 2002-present Medical School: Medical Student Summer Research Program (Sponsored by the Office of Research of the School of Medicine), UVa, lecturer.
- 2002-present Medical School: CT Physics (course for UVAHSC CT technologists), instructor.
- 2001 BIOM 784: Digital Image Analysis (graduate), guest lecturer.
- 2000 BIOM 693: Graduate independent study on the Physical Factors Influencing Detectability in X-ray and Gamma Ray Imaging, Spring 2000, instructor.
- 2000 PHY 393: 4th year research (undergraduate), instructor.
- 1999-2001 BIOM 454: Instructor.
- 1998-present Medical School: Continuing education lecturer, Department of Radiology technologists, various topics in mammography physics (~1 – 2 per year).
- 1997 Physics 384: Physics of the Human Body (undergraduate), co-instructor.
- 1996-present BIOM 783: Medical Image Modalities (graduate), one instructor of 3 - 4.

- 1996-present Diagnostic Radiological Physics (course for board preparation for residents in diagnostic radiology, UVA Radiology Dept), co-instructor.
 1996 CT Physics (course for UVAHSC MRI and CT technologists), instructor.

D. Other Teaching Activities

- 1997-2002 Instructor, High School Student Research Program (Sponsored by the Office of Research of the School of Medicine).

D. Bibliography Concerning Teaching

Textbook Chapters:

1. Williams MB and Fajardo LL. "Breast Imaging Systems: Design Challenges for Engineers". Biomedical Engineers' Handbook. McGraw-Hill, Inc. 2002.
2. Williams MB and Smith JJ. "Imaging Techniques". Radiology Recall, by Gay SP and Woodcock RJ, Jr. Lippincott-Williams and Wilkins, 1999.
3. Brookeman J, Williams MB, and Goode AR. "Precision of Radiological Measurement". Atlas of Roentgenographic Measurement, by Keats TE, M.D. St. Louis: Mosby Year Book, 1999.
4. Fajardo LL, Williams MB, and Harvey JA. "Future Innovations in Breast Imaging". Practical Approach to Stereotactic Breast Biopsy. (LL Fajardo, editor) Blackwell Science Publishing, 1995.

Online Monograph:

1. Williams, MB. "Update on Full Field Digital Mammography". AAPM Virtual Library, 2001, <http://www.aapm.org/#virtual>.

XIII. Masters and Ph.D. Theses Directed:

Date	Graduate Student	Degree
2004-present	[-----]	PhD, Physics
2004-present	[-----]	PhD, Biomedical Engineering
2002-present	[-----]	PhD, Engineering Physics
2001-present	[-----]	PhD, Physics
1999-present	[-----]	PhD, Biomedical Engineering
2000-2002	[-----]	MS, Biomedical Engineering
2000-2002	[-----]	MS, Biomedical Engineering
1998-2000	[-----]	MS, Biomedical Engineering
1997-2000	[-----]	PhD, Nuclear Engineering
1996-1998	[-----]	ME, Engineering Physics
1996-1998	[-----]	MS, Biomedical Engineering

Masters and Ph.D. Committees

PhD:

Date	Graduate Student	Degree	My Function
04/06	[-----]	PhD dissertation proposal	chair
10/05	[-----]	PhD dissertation defense	co-advisor
06/03	[-----]	PhD oral comp. exam	member
06/03	[-----]	PhD oral comp. exam	member
11/02	[-----]	PhD dissertation proposal	advisor
05/01	[-----]	PhD dissertation defense	chair
11/00	[-----]	PhD dissertation proposal	chair
08/00	[-----]	PhD dissertation defense	advisor
04/99	[-----]	PhD dissertation defense	chair
07/98	[-----]	PhD dissertation proposal	advisor
06/96	[-----]	PhD oral comp. exam	chair

Masters:

Date	Graduate Student	Degree	
08/04	[-----]	MS thesis defense	chair
05/02	[-----]	MS thesis defense	advisor
06/99	[-----]	MS thesis defense	advisor
05/88	[-----]	MS thesis defense	advisor
08/95	[-----]	MS thesis defense	member

XIV. Clinical Activities

1) Medical Physicist; Breast Care Center (BCC) and Northridge (NR) mammography facilities. Responsibilities are:

a) Conducting ACR/MQSA Physicist's Annual Survey of each upright clinical mammographic unit. Time requirements for these surveys are as follows:

Making measurements	12 hrs/unit
Calculations, write-up	3 hrs/unit
Follow up, consultation with service personnel	1 hr/unit
Total time per unit	16 hrs

We currently have 2 upright clinical screen/film mammography units and 3 upright digital mammography units, requiring a total of about **80 hours/year** for the annual surveys. Note that this is the **minimum** requirement. These surveys

must also be performed if a unit is moved or has any significant service performed on it.

- b) Conducting surveys of mammographic units for compliance with the State of Virginia's requirement for radiation producing equipment. These must be done annually, and any time there is a tube change or service that would impact radiation safety issues. Time requirements are:

Making measurements	4 hrs/unit
Calculations, write-up	1 hr/unit
Follow up, consultation with service personnel	1 hr/unit
Total time per unit	6 hrs

These surveys apply to each of our upright units, to our stereotactic needle biopsy unit in BCC, to our two research mammography units in MR4 and BCC, and to the GE digital systems in BCC and NR. So the total time is about **54 hours**.

- c) Responsibility for day-to-day QC of mammographic equipment and compliance with VA and MQSA regulations. This includes supervision and evaluation of technologist QC procedures and records, consultation with physicians, departmental technical support people, and with mammographic equipment vendors and service personnel. Estimated time is about 2-3 hrs per week, or about **120 hrs/yr**.

- d) Participation in mammography related activities such as MQSA inspections, obtaining ACR accreditation for individual mammographic units, participating in national and regional regulatory meetings, departmental QA meetings, technologist training seminars, and mammography journal club. These activities total to about 10 hrs per month, or **120 hrs/yr**.

- e) Participation in the selection, installation and acceptance testing of new mammography equipment, as well as in the maintenance, recalibration, and recertification of existing equipment. The average time spent on these functions is about 5 hrs/month or **60 hrs/year**.

- 2) Performance of annual and spot surveys of the departmental CT scanners. We have four spiral scanners, including two GE Lightspeed multislice scanners (8-slice and 16-slice). Annual surveys average about 6 hours per scanner, including write-up. Spot surveys take about half that time. A spot survey must be performed each time a tube is replaced. This is a frequent occurrence. A reasonable estimate is 3 spot surveys per year per scanner. So the yearly total for CT responsibilities is about **60 hours/year**.

The total of the above time requirements for all clinical responsibilities is a minimum of approximately **500 hours/year**.

XV. Areas of Research Interest

My research involves the design and development of radiation detection systems for medical imaging, quantification of basic performance characteristics and efficacy of imaging systems. Of particular interest currently is the development of multimodal imaging systems that obtain spatially correlated structural and functional information.

Current Major Projects

1) *Image guidance for non-palpable breast lesions:* We are developing a system for radio-guided breast surgery, which will provide an alternate to wire localization. Under stereoscopic x-ray imaging, a small amount of radiolabeled compound is injected directly into the breast lesion. Location of the injection site relative to that of the lesion center is then measured using an integrated small field of view gamma camera. Image information is sent to the breast surgeon who then uses a hand-held gamma ray probe to locate and excise the lesion. It is anticipated that, compared to current wire localization techniques, this approach will provide more accurate lesion localization, less ambiguity for the surgeon, and greater comfort for the patient.

2) *Dual modality breast imaging:* We have developed an integrated imaging system that combines the sensitivity of digital mammography with the specificity of scintimammography in a single unit. The system is used to obtain diagnostic information regarding suspicious or radiographically occult mammographic findings, and functions by obtaining mirror-image x-ray transmission and gamma emission images concurrently with the breast in a single configuration. Co-registration then correlates the gamma and x-ray images to within a fraction of a pixel. This system is currently being evaluated in a pilot clinical study. A second dual modality breast scanner that will permit multiple view image acquisition (i.e. 3-dimensional image reconstruction) is also under development.

3) *Molecular imaging systems for small animal research:* We have developed an imaging system that permits simultaneous acquisition of high resolution functional (nuclear medicine) and structural (digital x-ray) images from mice and rats. The resulting fused image correlates the radiotracer distribution with the morphological information provided by the x-ray data. The system has been utilized for the past three years for a variety of mouse and rat studies in gene expression imaging, immunology, radiation oncology and diagnostic radiology. We are also developing a second small animal scanner that will obtain co-registered 3-dimensional image data by combining x-ray computed tomography (CT) and single gamma emission computed tomography (SPECT).

XVI. Grant Funding

Extramural Principal Investigator Grants

[-----]

[----- (Williams, MB)

[-]commitment

Monochromatic X-ray Filter Research

09/01/05 – 08/31/06

\$[-----]

The goal of this project is to develop filters to produce monoenergetic x-ray beams for diagnostic imaging, especially breast imaging.

2 R44 EB000942-02 (Appleby, M) 09/01/05 – 07/31/07
 Subcontract (Williams, MB) \$103,903 (direct costs year 1)
 SBIR/NIH Phase II \$60,091 (direct costs year 2)
 10% commitment
 Advanced Collimators and Detectors for Nuclear Medicine

The objective of this program is to develop high efficiency matched collimators for pixilated gamma cameras.

9 R44 CA111318-02 (Appleby, M) 7/1/04 – 6/30/06
 Subcontract (Williams, MB) \$62,892 (direct costs year 1) 0%
 SBIR/NIH Phase II \$58,179 (direct costs, year 2) 0%
 10% commitment
 Improved scatter reduction grids for mammography

The objective of this project is to develop specialized grids for analog and digital mammography.

IMG0402326

[-----](Williams, MB)
 “Dual Modality Imaging for Radioguided Breast Surgery”
 [--]commitment
 5/1/04 - 4/30/06
 \$[----] (total direct, year 1) \$[-----] total
 \$[-----] (total direct, year 2) \$[-----] total
 \$[-----] (total direct all years) \$[-----] total all years

NIH/NCI

“Application of Breast Imaging Technologies to Molecular Imaging”
 5RO1 CA 69452 (Competing renewal)
 40% commitment
 07/01/01- 06/30/04
 \$236,599 (total direct, year 1) \$310,083 total
 \$324,219 (total direct, year 2) \$390,651 total
 \$289,639 (total direct, year 3) \$370,017 total \$1,070,751 total all
 years

NIH/NCI

“Small Animal Imaging Resource Program”
 Subcontract to Johns Hopkins University (M Pomper, PI)
 5% commitment
 03/10/04 - 12/31/06
 Total funding to UVA:
 \$47,701 (year 1)

\$49,630 (year 2)
\$51,119 (year 3)
\$147,449 total

NCI/NIBIB

1 R43 EB0000942-01 (Appleby, M) 11/10/03 – 1/31/04
Subcontract (Williams, MB) \$3290 (direct costs)
SBIR/NIH Phase I
Advanced Collimators for Nuclear Medicine

The objective of this project is to develop specialized collimators for breast scintigraphy.

NCI/NIBIB

1 R21 EB002321-01 (Appleby, M) 11/10/03 – 8/31/04
Subcontract (Williams, MB) \$6579 (direct costs)
SBIR/NIH Phase I
Advanced Collimators for Nuclear Medicine

The objective of this project is to develop low cost collimators for breast scintigraphy.

[-----]

“Novel System for Dual Modality Breast Imaging”
#99-003050

[-----]

12/31/99 - 12/30/03 (including no-cost extension)

\$[-----] (total direct, year 1)	\$[-----] total
\$[-----] (total direct, year 2)	\$[-----] total
\$[-----] (total direct all years)	\$[-----] total all years

[-----]

Conference support grant for 2001 HiRes meeting, September 2001, Washington, DC.
\$[---]direct

US Army Medical Research and Materiel Command

“Dual Modality Imaging System for Breast Cancer Diagnosis”
BC980469

15% time commitment

8/1/99 - 7/31/04 (including no-cost extension)

\$110,429 total year 1

\$114,939 total year 2

\$105,817 total year 3

\$331,184 total

US Army MRMC

“Clinical Evaluation of Digital Mammography”
Subcontract to Johns Hopkins University (LL Fajardo, PI)
BC970187

20% Year 1, 10% Year 2.
8/1/99 - 2/28/02
\$45,312 (total direct, 18 months)
\$21,750 (total indirect, 18 months)
\$67,062 (total, 18 months)

US Army MRMC

“Automatic Exposure Control Device for Digital Mammography”
Subcontract to Johns Hopkins University (LL Fajardo, PI)
DAMD17-99-1-9429
6% time commitment
8/31/99 - 9/1/02
\$25,575 (total to UVa)

National Institutes of Health/NCI

"Discontiguous Array Detector for Digital Mammography"
RO1 CA 69452
50% time commitment
6/1/96 - 5/31/01
\$429,569 total year 1
\$527,162 total year 2
\$403,137 total year 3
\$1,359,868 total

[-----]

“Gamma Ray Imaging Detectors for Breast Cancer Diagnosis”
BIO-97-011
[--]effort
6/1/97 - 5/31/98
\$[-----] (total)

[-----]

“Investigation of the Optimum Imaging Geometry in Scintimammography Using a Dedicated Gamma Camera”
12/1/97 - 11/3/98
Radiopharmaceutical value: \$[---]

DHHS/Office of Women’s Health

“Federal Technology Transfer Program to Advance Novel Breast Imaging Technologies: Multicenter Clinical Evaluation of Digital Mammography”
Subcontract to University of Toronto (MJ Yaffe, PI)
282-97-0078
5% effort
9/30/97 - 3/31/99
\$22,226 (total to UVa)

US Army MRMC

"Mammographic Database for Compression Studies"

Subcontract to Stanford University (R Gray, PI)
5% effort
5/1/95 - 12/31/97
\$25,212 (total to UVa)

Intramural Principal Investigator Grants

[-----] (Williams, MB)
Dual Modality Surgical Guidance 11/01/05 – 06/31/07
\$[----] total direct
The goal of this pilot project is to clinically evaluate a new technique for image-guided surgery of nonpalpable breast lesions.

[-----]
[-----]
[-----] 01/01/02 - 12/31/04
“Noninvasive Imaging Core” \$[----] direct, each year

[-----]
“High resolution CCD-based X-ray Detector for Small Animal CT”
MD-DMED 116017
01/03/02 – 3/24/06
\$ [----] (direct)

NIH/NCI
“Prototype Scanner for Multimodality Volumetric Imaging”
P30 CA44579 (UVa Cancer Center Technology Development Grant)
05/01/00 - 04/30/01
5% time commitment
\$35,000 (direct), \$51,800 (total)

Co-Investigator in Other Funded Projects

1) NIH/NCI
“Analysis of Displays for Full Breast Digital Mammography Imaging”
CA 76564 (SJ Dwyer III, PI)
7/1/98 – 6/3/01
10% time commitment
\$121,249 (total Year 1)
\$121,772 (total Year 2)
\$125,268 (total Year 3)

2) NIH/NCI
“UVa Cancer Center”
P30 CA44579 (Meyers, CE)
08/01/99 - 07/30/04

10% time commitment
\$42,560 (total, each year)

- 3) [-----]
“Clinical Trial of Computed Tomographic Laser Mammography”
11/02/99 - 04/30/01
[-]commitment
The major goal of this project is to evaluate a test system for optical breast imaging that uses laser scanning.

XVII. Patents Submitted

1. [-----

-----]
2. [-----]
3. [-----
-----]
4. [-----]

XVIII. Papers Published or in Press

A. Publications in Peer Reviewed Journals

In print

1. [-----
-----] In press, [-----]
2. Kundu BK, Stolin AV, Pole J, Baumgart L, Fontaine M, Wojcik R, Kross B, Zorn C, Majewski S, and Williams MB. Tri-modality small animal imaging system. IEEE Transactions on Nuclear Science 2006; 53(1):66-70.
3. Galkina E, Thatte J, Dabak V, Williams MB, Ley K, and Braciale TJ. Preferential migration of effector CD8+ T cells into the interstitium of the normal lung. The Journal of Clinical Investigation 2005; 115:3473-3483.
4. Harvey JA, Bovberg V, Smolkin M, Williams MB, Petroni G. Evaluating Hormone Therapy Associated Increases in Breast Density: Comparison Between Reported and Simultaneous Assignment of BI-RADS Categories, Visual Assessment, and Quantitative Analysis. Acad Radiology 2005; 12:853-862.

5. More MJ, Narayanan D, Goodale PJ, Harvey J, and Williams MB. Analysis of Spatial Correlation Between ^{99m}Tc -Sestamibi Uptake and Radiographic Breast Density. *Technology in Cancer Research and Treatment* 2005; 4(3): 265-273.
6. Williams MB, Goodale PJ, and Butler PF. The Current Status of Full-Field Digital Mammography Quality Control. *Journal of the American College of Radiology* 2004; 1(12):936-951.
7. Daniel TM, Altes TA, Rehm PK, Williams MB, Jones DR, Stolin AV, and Gay SB. A Novel Technique for Localization and Excisional Biopsy of Small or Ill-Defined Pulmonary Lesions. *Annals of Thoracic Surgery* 2004; 77:1756-1762.
8. More MJ, Narayanan D, Goodale PJ, Majewski S, Welch B, Wojcik R, Kieper DA, and Williams MB. X-ray Stereotactic Lesion Localization in Conjunction with Dedicated Scintimammography. *IEEE Transactions on Nuclear Science* October 2003; 50(5):1636-1642.
9. Williams MB, Stolin AV, and Kundu BK. Investigation of Spatial Resolution and Efficiency Using Pinholes with Small Pinhole Angle. *IEEE Transactions on Nuclear Science* October 2003; 50(5):1562-1568.
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In press

None.

B. Conference Publications and Invited Articles

1. Stolin A, Pole D, Majewski S, Kross B, Weisenberger A, Wojcik R, and Williams MB. Design and Characteristics of a Small Animal Multi-Modality Scanner. Conference Record of the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 26-30, 2005, San Juan, Puerto Rico.
2. Raghunathan P, Goodale PJ, Klinger J, Appleby M, Atkinson J, AND Williams MB. Matched Collimators for Pixellated Gamma Cameras. Conference Record of

- the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 26-30, 2005, San Juan, Puerto Rico.
3. More MJ, Goodale PJ, Majewski S, and Williams MB. Evaluation of Gamma Cameras for Use in Dedicated Breast Imaging. Conference Record of the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 18-22, 2004, Rome, Italy.
 4. Stolin A, Kundu BK, Majewski S, and Williams MB. Characterization and Comparison of X-ray Detectors for Use in Small Animal Imaging. Conference Record of the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 18-22, 2004, Rome, Italy.
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 15. Williams MB, More MJ, Venkatakrishnan V, Niklason L, Yaffe MJ, Mawdsley G, Bloomquist A, Maidment ADA, Chakraborty D, Kimme-Smith C, and Fajardo LL. "Beam optimization for digital mammography". IWDM 2000: 5th International Workshop on Digital Mammography. (Martin J. Yaffe, Editor). Medical Physics Publishing. Madison, Wisconsin, 2001; 108-119.
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C. Refereed Abstracts (since 1995)

1. Stolin A, Pole D, Majewski S, Kross B, Weisenberger A, Wojcik R, and Williams MB. Design and Characteristics of a Small Animal Multi-Modality Scanner. Conference Record of the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 26-30, 2005, San Juan, Puerto Rico.
2. Raghunathan P, Goodale PJ, Klinger J, Appleby M, Atkinson J, AND Williams MB. Matched Collimators for Pixellated Gamma Cameras. Conference Record of the IEEE Nuclear Science Symposium and Medical Imaging Conference, October 26-30, 2005, San Juan, Puerto Rico.
3. More MJ, Goodale PJ, Li H, Zheng Y, Majewski S, Popov V, Welch and Williams MB. Limited Angle Dual Modality Breast Imaging. IEEE Nuclear Science Symposium and Medical Imaging Conference, October 16-22, 2004, Rome, Italy.
4. More MJ, Goodale PJ, Majewski S and Williams MB. Evaluation of Gamma Cameras for use in Dedicated Breast Imaging. IEEE Nuclear Science Symposium and Medical Imaging Conference, October 16-22, 2004, Rome, Italy.
5. Stolin AV, Kundu BK, and Williams MB. Components of a Small Animal CT-SPECT Scanner. Workshop on Small-Animal SPECT Imaging, January 14-16th, 2004, Tucson, AZ.
6. Williams MB, Stolin AV, Kundu BK, Zheng Y, and Li H. Investigation of Square Cross-Section Apertures for Small Animal Pinhole SPECT. International Conference of the Academy of Molecular Imaging, September 21-24, 2003, Madrid, Spain.

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15. Williams MB, More MJ, Narayanan D, Majewski S, Welch B, and Kieper DA. Improved Breast Scintigraphy Using Digital Mammography. Presented at the IEEE Nuclear Science Symposium and Medical Imaging Conference, November 7-11, 2001, San Diego, CA.
16. Williams MB, Majewski S, Wojcik R, Weisenberger AG, Phillips W, and Stewart A. Prototype CT-SPECT Scanner for Small Animal Imaging. Presented at High Resolution Imaging in Small Animals with PET, MR, and Other Modalities: Instruments and Applications in Modern Biomedical Research, September 9-11, 2001, Rockville, MD.
17. Williams MB, Goode AR, Galbis-Reig V, Simoni PU, Varady P, Berr SS, Kallmes D, Majewski S, Weisenberger D, Wojcik R, Stanton M, Phillips W, and Stewart A.

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18. Williams MB, Stanton M, Majewski S, Goode AR, Galbis-Reig V, Simoni PU, Berr SS, Phillips W, Stewart A, Weisenberger AD, and Wojcik R. Technologies for Breast Imaging and Molecular Imaging. Presented at the NIH Biomedical Imaging Symposium, June 25-26, 1999, Bethesda, MD.
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37. Liu H, Fajardo LL, Buchanan NL, and Williams MB. Lesion Detectability: Analysis of Charge Coupled Device X-ray Imaging Systems. *Radiology* 1995; 197(P):329.

D. Book Reviews

1. Radiation and Modern Life: Fulfilling Marie Curie's Dream, by Alan E. Walter. Review published in the *Journal of the American College of Radiology* 2005; 2(7):645.

E. Scientific Exhibits (since 1996) Note: In the period between 1996 and 1999 the acceptance rate for Scientific Exhibits at the RSNA meeting was 36% -43%

1. "X-Ray and Gamma Ray Image Fusion in a Dual Modality Imaging System". Williams MB, Galbis-Reig V, Goode AR, Simoni PU, Majewski S, and Stanton M. Meeting of the Radiological Society of North America, November 29 – December 4, 1998, Chicago, IL.
2. "Radiologist Preferences for Digital Mammography Display". Pisano E, et al. Meeting of the Radiological Society of North America, November 29 – December 4, 1998, Chicago, IL.
3. "Workstation Display of Images from Prototype Detector for Whole Breast Digital Mamography". Williams MB, Mangiafico PA, Simoni PU, Stanton M, and Phillips W. Inforad Exhibit, Meeting of the Radiological Society of North America, November 30 – December 5, 1997, Chicago, IL.
4. "Full Field Digital Mammography Using CCD Technology". Stanton M, W Phillips, Williams MB, O'Mara D, and Qian H. Inforad Exhibit, Meeting of the Radiological Society of North America, November 30 – December 5, 1997, Chicago, IL.
5. "Projects Funded Under the NCI/NASA Technology Transfer Program in Digital Mammography". Winfield D, et al. Capitol Hill Briefing on New Frontiers in Breast Cancer Imaging and Early Detection, September 17, 1996.
6. "Breast Imaging Research Projects at the UVa Department of Radiology". Williams MB. Capitol Hill Briefing on New Frontiers in Breast Cancer Imaging and Early Detection, September 17, 1996.
7. "Gray-Scale Display for Digital Mammography". Dwyer SJ, Fajardo LL, and Williams MB. Scientific Exhibit, Meeting of the Radiological Society of North America, December 1-6, 1996, Chicago, IL.
8. "A Flexible Approach to Digital Mammography Using Multiple CCD-Based Modules". Stanton MJ, Phillips W, Williams MB, Rosen D, Xie J, and Stewart A. Inforad Exhibit, Meeting of the Radiological Society of North America, December 1-6, 1996, Chicago, IL.
9. "Correspondence of Quality Control Test Failures and Clinical Image Failures in Digital Mammography". Kimme-Smith C, Williams MB, Fajardo LL, Bassett LW, and Valentino D. Inforad Exhibit, Meeting of the Radiological Society of North America, December 1-6, 1996, Chicago, IL.
10. "Digital Mammography Image Management Network". Dwyer SJ, Williams MB, Weaver AC, deParedes ES, and Mulvaney J. Inforad Exhibit, Meeting of the Radiological Society of North America, December 1-6, 1996, Chicago IL.

XIX. Extramural Invited Talks (since 1996)

1. “Fused Optical, Scintigraphic, and Radiographic Imaging of Small Animals”. Presented at the 1st Annual P50 ICMIC/SAIRP Retreat, July 12, 2004, Johns Hopkins University, Baltimore, MD.
2. “In Vivo Molecular Imaging of Small Animals”. Presented at the 3rd International Conference on Bioengineering and Bioinformatics, April 20, 2004, Delta Academy of Science, Mansoura, Egypt.
3. “Nuclear Medicine as an Adjunct Modality for Breast Imaging”. Presented at the Johns Hopkins Breast Imaging Physics Symposium, September 13, 2003, Johns Hopkins University, Baltimore, MD.
4. “Digital Mammography Quality Control”. Presented at the Johns Hopkins Breast Imaging Physics Symposium, September 13, 2003, Johns Hopkins University, Baltimore, MD.
5. “Molecular Imaging Using Integrated Functional-Structural Scanners”. Presented to the Cleveland Biomedical Imaging Group and the IEEE Societies of Signal Processing, Engineering in Biology and Medicine, Computer and Nuclear and Plasma Sciences, April 24, 2003, Case Western University Hospital, Cleveland, OH.
6. “Combined Gamma Emission and X-ray Transmission Breast Imaging”. Presented at the Workshop on the Radiology of Breast Cancer, November 16, 17, 2002, Norfolk, VA.
7. “Dual Modality Imaging System for Breast Cancer Research”. Presented at the Era of Hope Department of Defense Breast Cancer Research Program Meeting, September 28, 2002, Orlando, FL.
8. “Dual Modality Small Animal Imaging”. Presented at the 21st Annual Meeting of The Society for Physical Regulation in Biology and Medicine, January 30-February 1, 2002, San Diego, CA.
9. “Technical Considerations in Full Field Digital Mammography”. Presented to the American College of Radiology, August 15, 2001, ACR Headquarters, Reston, VA.
10. “Update on Full Field Digital Mammography”. CME lecture presented at the 43rd Annual Meeting of the American Association of Physicists in Medicine, July 22, 2001, Salt Lake City, UT.
11. “Integrated System for Diagnostic Breast Imaging”. Presented at the Association for the Advancement of Medical Instrumentation Conference and Exposition, June 10, 2001, Baltimore, MD.

12. "Dual Modality Breast Imaging: Structure and Function". Presented at the International Conference on Technology in Cancer Research and Treatment in the New Millennium, June 27-30, 2001, Albany, NY.
13. "Dual Modality Breast Imaging". Presented at the First Topical Symposium on Functional Breast Imaging with Advanced Detectors, April 18-21, 2001, Rome, Italy.
14. "Mammography Physics and Quality Assurance Issues". December 11, 2000, Johns Hopkins University, Baltimore, MD.
15. "Integrated CT-SPECT System for Small Animal Imaging". SPIE Conference on Hard X-ray and Gamma-ray Detector Physics, Optics, and Applications, August 3, 2000, San Diego, CA.
16. "Gamma-Ray Detectors for Breast Imaging". SPIE Conference on Hard X-ray and Gamma-ray Detector Physics, Optics, and Applications, August 1, 1997, San Diego, CA.
17. "Stereotaxic Breast Biopsy: Digital Detectors". American Association of Physicists in Medicine Annual Meeting, Refresher Course, July 30, 1997, Milwaukee, WI.
18. "Dedicated Gamma Detectors for Breast Imaging". AAPM Mid-Atlantic Scientific Meeting, AAPM Headquarters, May 16, 1997, College Park, MD.
19. "Detector Designs for Digital Mammography". Computed Radiography: An Educational Forum, February 1-4, 1997, Clearwater, FL.
20. "Acquisition Strategies for Full Breast Digital Mammography". Inforad Theater Presentation, RSNA meeting, December 2, 1996, Chicago, IL.
21. "New Detection Techniques for PET Imaging of Breast Tumors". Thomas Jefferson National Accelerator Facility (TJNAF) and the Southeastern Universities Research Association (SURA), at TJNAF, August 28, 1996, Newport News, VA.